Space Weather Forecast

Issued on Monday, 16 October 2023 at 01:17 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Minor Geomagnetic Storm G1, peaking to start UTC working week and perhaps again midweek. Rising Chance of R1 Minor Radio Blackouts.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was low in the past 24 hours, with occasional low-level Common-class X-ray flares, peaking with a mid-ranking event at 15/1633UTC from a small sunspot group near the middle of the facing side of the Sun. Other small flares were generally concentrated near the oncoming eastern solar horizon.

There are now up to six sunspot regions on the facing side, with no one group dominating in terms of activity, in part due to the relatively magnetically simple front sided cohort. The main observed trends in the period were slight trailing spot proliferation and spreading in two eastern solar hemisphere spot regions, although both were small and simple magnetically.

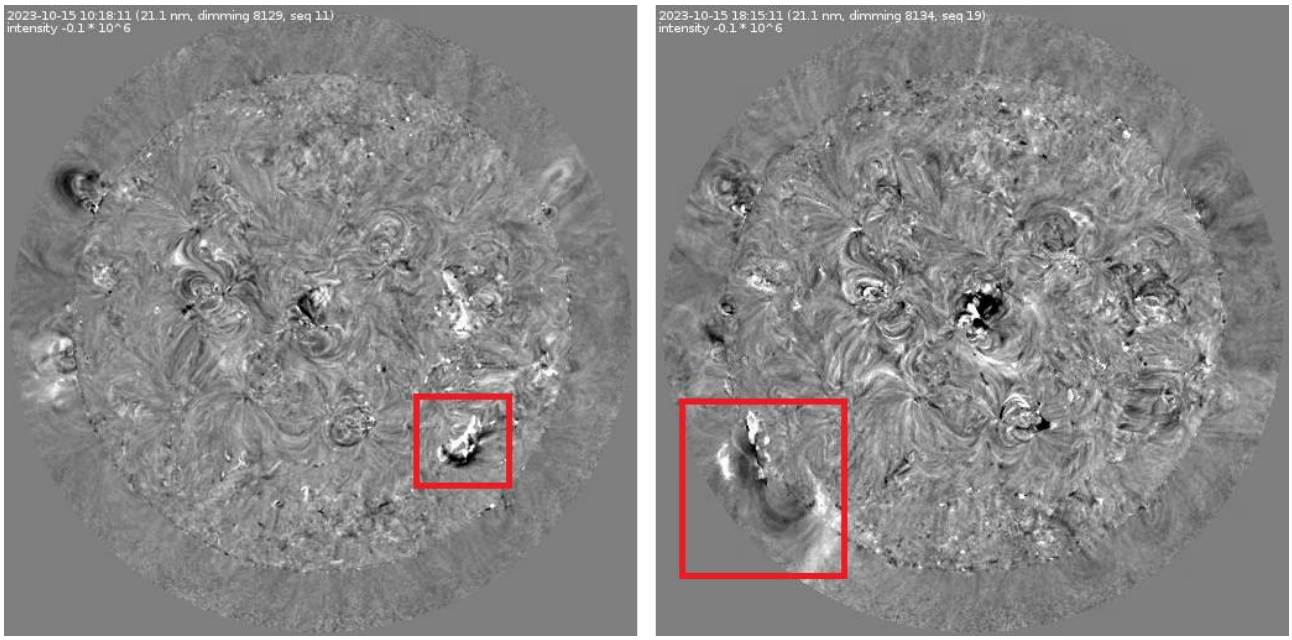

Figure 1: SIDC ROB-derived time integrated extreme UV imagery, showing two possible CME-producing events seen in the period. At the time of writing, neither is thought likely to have any component on the Sun-Earth line.

There were a few potential Coronal Mass Ejection (CME)-producing events seen in the 24 hours. Perhaps most notable amongst these was a 'filament eruption' (arc of plasma leaving the Sun) from the southwest. This was visible in ground-based near infrared telescopes at 15/1004UTC. A

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faint and narrow CME was subsequently seen in satellite imagery, apparently heading largely ahead of the track of the Earth in its orbit. This has been analysed and although modelling is awaited, provisionally it appears too narrow to have any Earth-directed component. In addition to this event, a 'prominence eruption' (arc of plasma leaving the edge of the solar disc) was seen from the southeast at 15/1809UTC. Satellite imagery is awaited for this event, however any Earth effects from this longitude are considered unlikely.

Solar Wind / Geomagnetic Activity: Solar winds suggested an exit from the tail of the recent fast wind, transitioning into a slow regime. The solar wind speed showed a continued decline from early slightly elevated highs, eventually reaching background levels. The number of particles in the solar wind was steady at background levels, while the magnetic field was similarly unremarkable. The net result of the above solar wind measures was for provisionally quiet geomagnetic activity throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: There is a slightly rising Chance of Moderate-class flares at first in the four-day period as a result of potential returning sunspot regions crossing the eastern solar horizon.

Solar Wind / Geomagnetic Activity: A fast wind emanating from another 'coronal hole' should arrive later in the UTC day of Monday 16 October, bringing a chance of Minor Geomagnetic Storm G1. Up to two CMEs then feature in the forecast, both low confidence and both glances, but potentially crossing Earth orbit later in the UTC morning of Wednesday 18 October, and giving a further chance of G1, probably with a preceding lull in activity.

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	20	30	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

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Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	25	30	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	2	2	2	2
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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